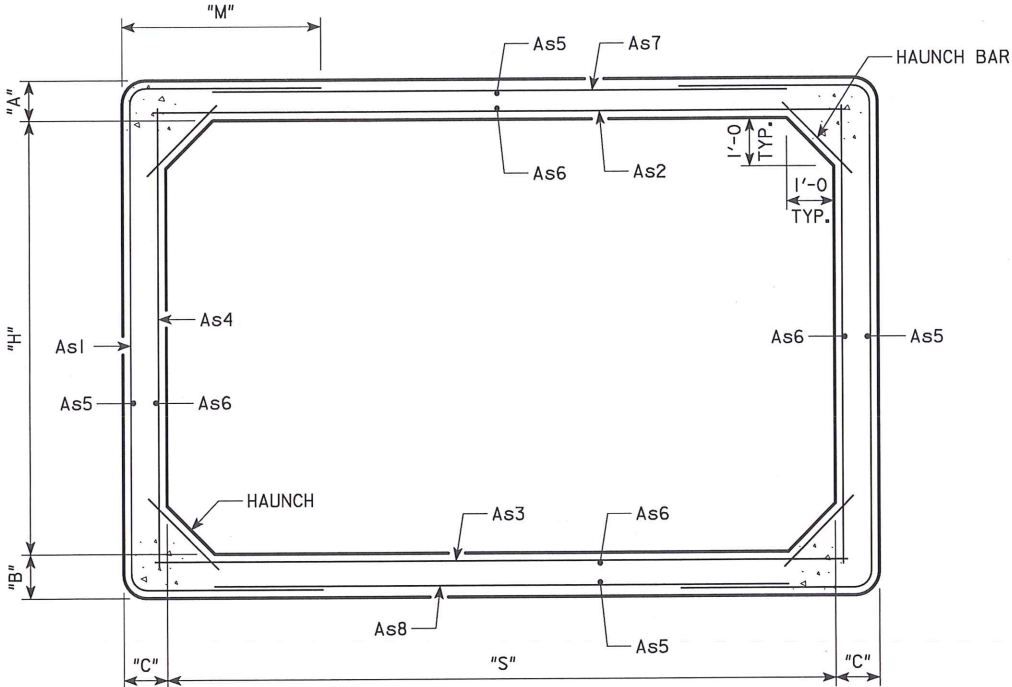


ENGLISHIGNEDPRECASTCULVERTS.DGN - PRCB 14-13 - THIS SHEET ISSUED ??-?-??.

VARIABLE DIMENSIONS AND QUANTITIES FOR 14' SPAN BARREL SECTIONS

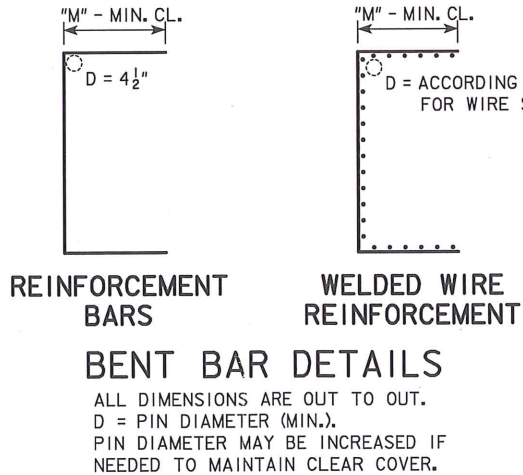
DIMENSIONS									REINFORCEMENT REQUIREMENTS (IN <sup>2</sup> /FT)										WEIGHT (LB/FT)	
									As1			As2		As3		As4		As7/As8		
SIZE	CLASS	f'c (ksi)	FILL	S	H	A	B	C	AREA	LENGTH	M	AREA	LENGTH	AREA	LENGTH	AREA	LENGTH	AREA	LENGTH	
14x14	2	5.0	8-12	14	14	10	10	10	0.87	25'-0	4'-11	1.52	14'-6	1.66	14'-6	0.38	14'-6	0.24	8'-10	7720



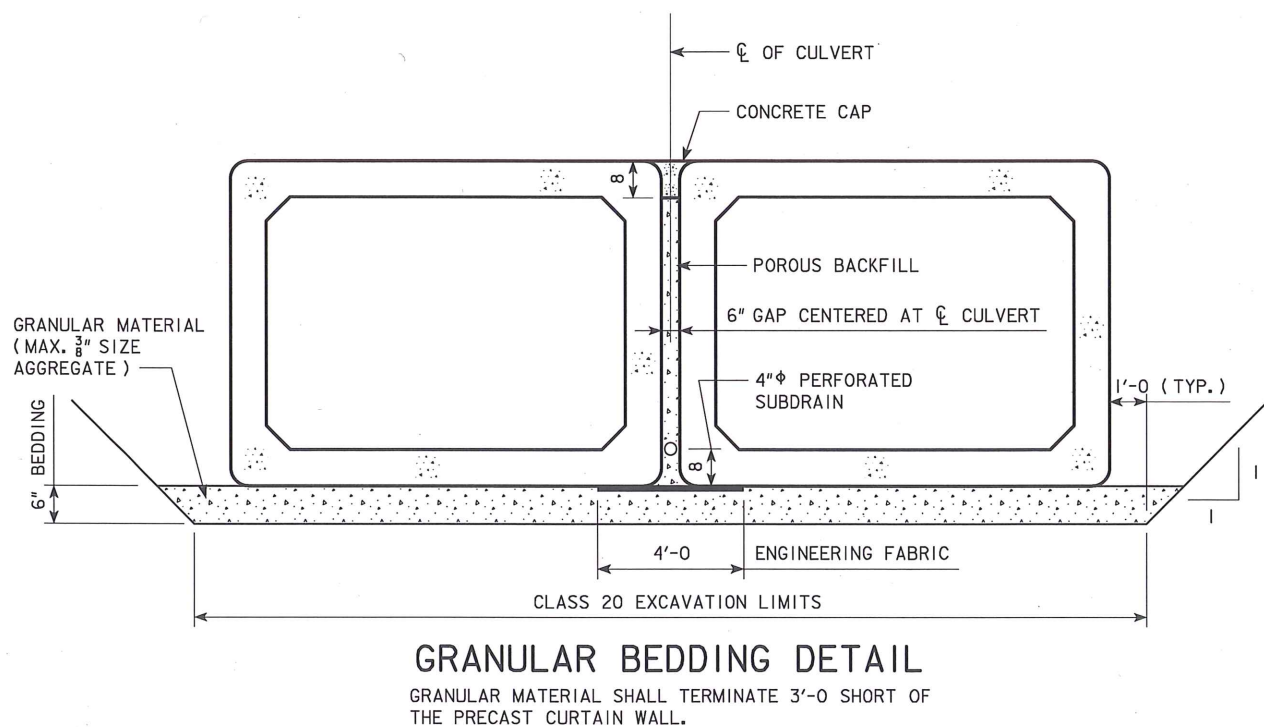
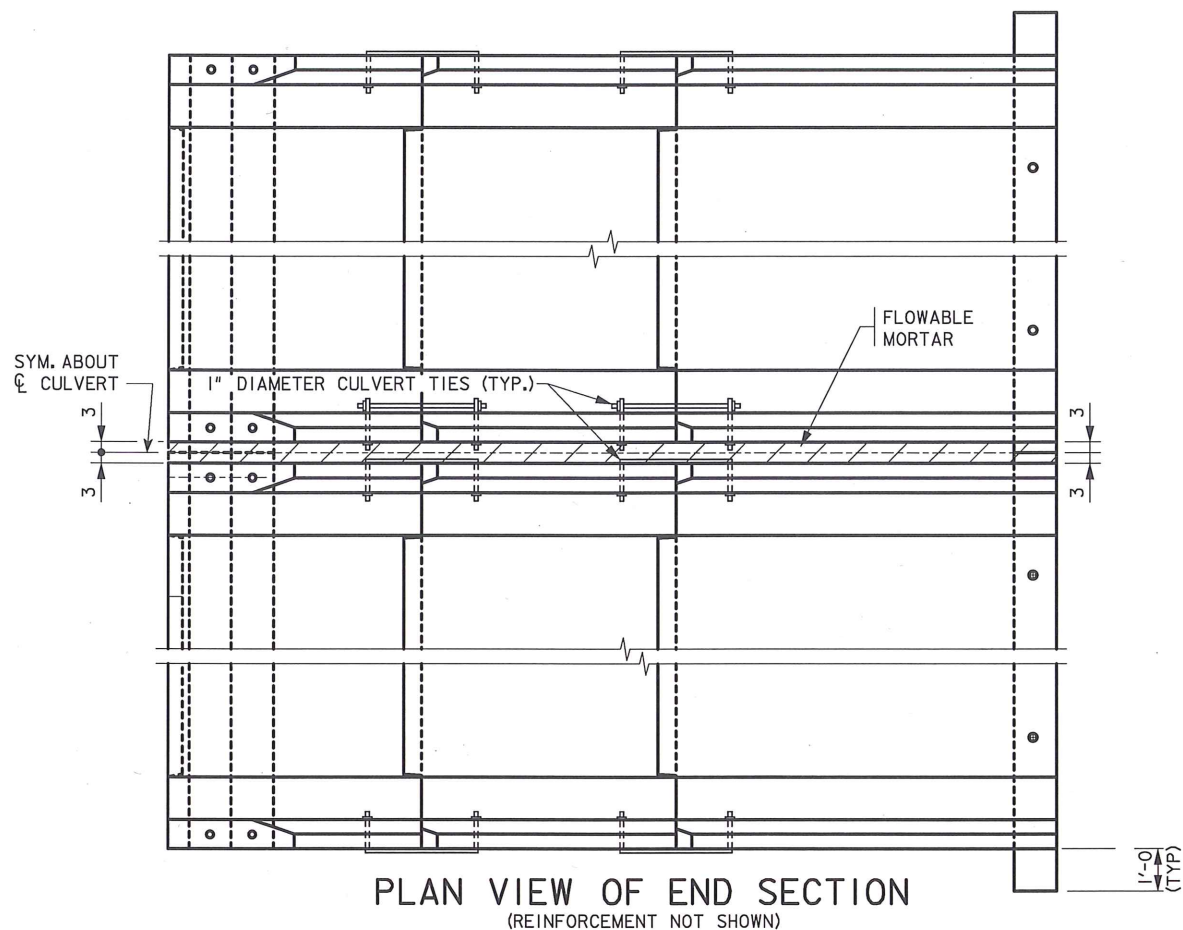
TYPICAL BARREL SECTION

**NOTES:**  
DIMENSIONS "A", "B" & "C" LISTED IN THE BAR LIST ARE IN INCHES.  
LONGITUDINAL REINFORCEMENT DENOTED AS As5 AND As6 MUST BE PLACED IN SLAB, FLOOR, AND WALLS AND MUST BE 0.06 IN<sup>2</sup>/FT MINIMUM.  
ALL REINFORCEMENT LENGTHS AND AREAS ARE MINIMUM REQUIREMENTS.  
IF REINFORCING BARS ARE SUBSTITUTED FOR WELDED WIRE REINFORCING, DIMENSION "M" AND/OR LENGTH OF THE As7/As8 REINFORCEMENT SHALL BE ADJUSTED TO ENSURE ADEQUATE LAP LENGTH IS PROVIDED.  
WEIGHT OF SECTIONS ASSUMES A DENSITY OF 150 PCF AND SQUARED CORNERS.

PRELIMINARY  
NOT FOR CONSTRUCTION



DESIGN FOR ?  
**14' x 14' x ? PRECAST REINFORCED CONCRETE BOX CULVERT**  
**BARREL DETAILS**  
STATION: 15+62.33  
**MITCHELL COUNTY**  
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
DESIGN SHEET NO. \_\_\_\_ OF ? FILE NO. 30927 DESIGN NO. 113



## GRANULAR BEDDING NOTES:

ENGINEERING FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 3, OF THE STANDARD SPECIFICATIONS. A 4 FOOT WIDE STRIP OF ENGINEERING FABRIC SHALL BE PLACED ON TOP OF THE GRANULAR BEDDING MATERIAL AND CENTERED OVER THE CENTERLINE OF CULVERT BEFORE THE PRECAST CULVERTS ARE PLACED. ENGINEERING FABRIC SHALL BE PLACED THE FULL LENGTH OF THE PRECAST CULVERT. ALL COSTS INCLUDING MATERIAL AND LABOR ASSOCIATED WITH PROVIDING THE ENGINEERING FABRIC AND INSTALLING IT AS REQUIRED SHALL BE INCLUDED IN THE BID ITEMS "PRECAST CONCRETE BOX CULVERT" AND "PRECAST BOX CULVERT STRAIGHT END SECTION".

THE 4" DIAMETER SUBDRAIN SHALL TERMINATE AND BE CAPPED AT THE UPSTREAM END 12 INCHES SHORT OF THE END OF THE APRON OF THE END SECTION. THE SUBDRAIN SHALL OUTLET DOWNSTREAM AT THE END OF THE APRON OF THE END SECTION. THE SUBDRAIN SHALL BE SURROUNDED BY POROUS BACKFILL IN ACCORDANCE WITH SECTION 4131, OF THE STANDARD SPECIFICATIONS. NO COMPACTION OF THE POROUS BACKFILL IS REQUIRED.

THE POROUS BACKFILL SHALL BE PLACED BETWEEN THE PRECAST BARREL WALLS UP TO 8 INCHES FROM THE TOP OF THE BARREL SLABS. POROUS BACKFILL SHALL ALSO BE PLACED BETWEEN THE END SECTIONS UP TO 8 INCHES FROM THE TOP OF THE WALLS AND 8 INCHES SHORT OF THE END OF THE APRON OF THE END SECTION. THE POROUS BACKFILL SHALL BE IN ACCORDANCE WITH SECTION 4131, OF THE STANDARD SPECIFICATIONS.

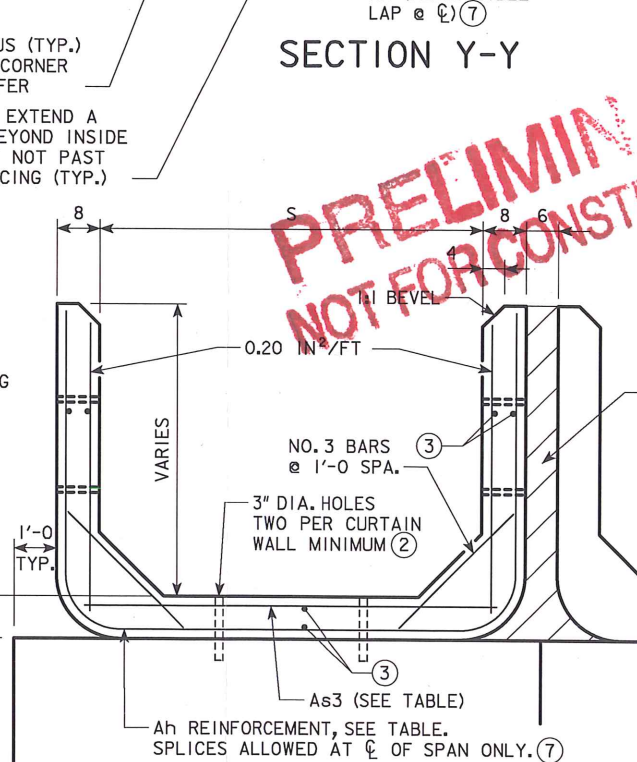
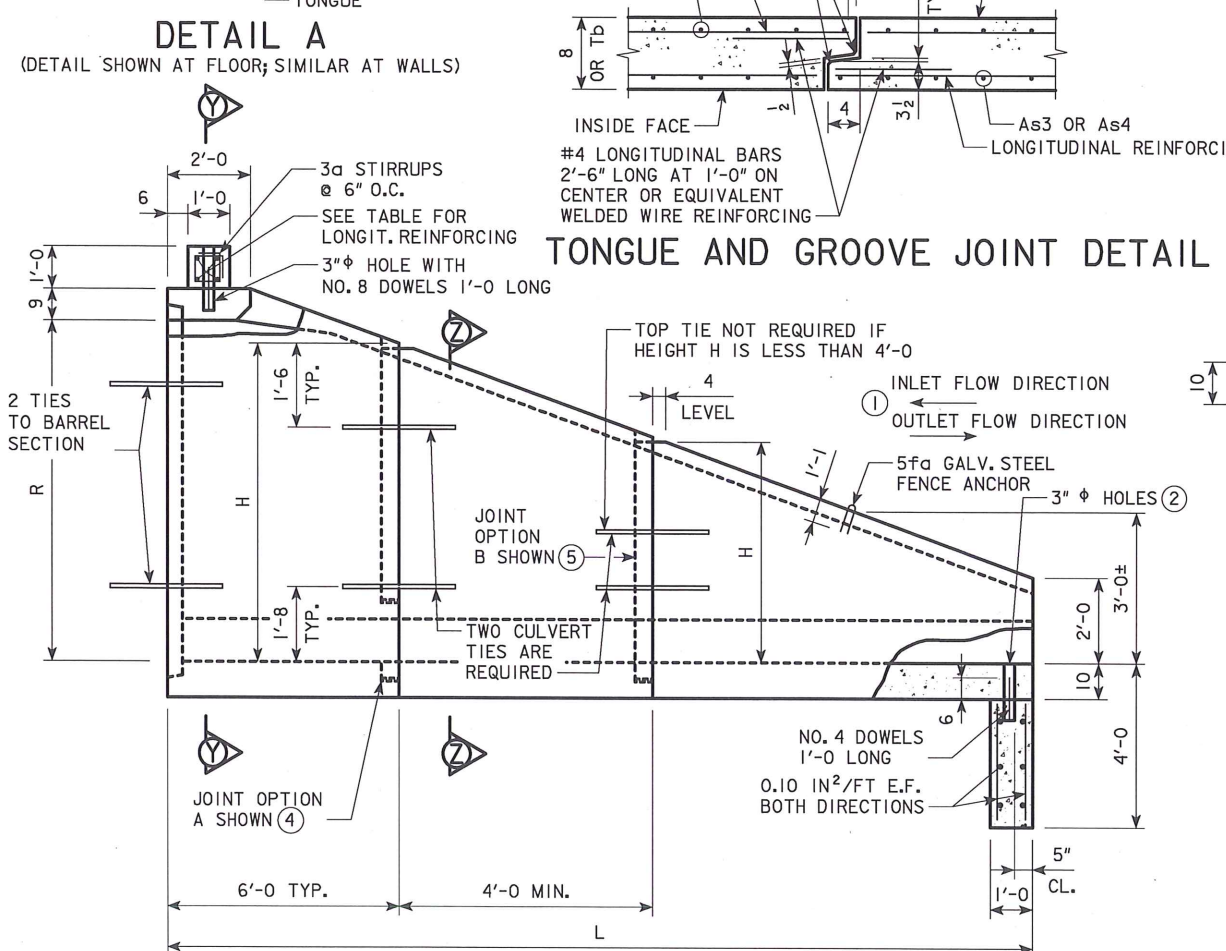
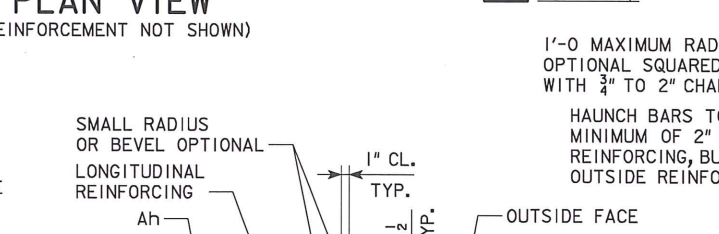
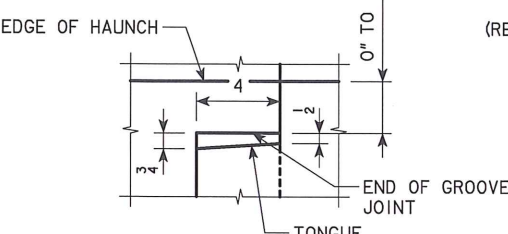
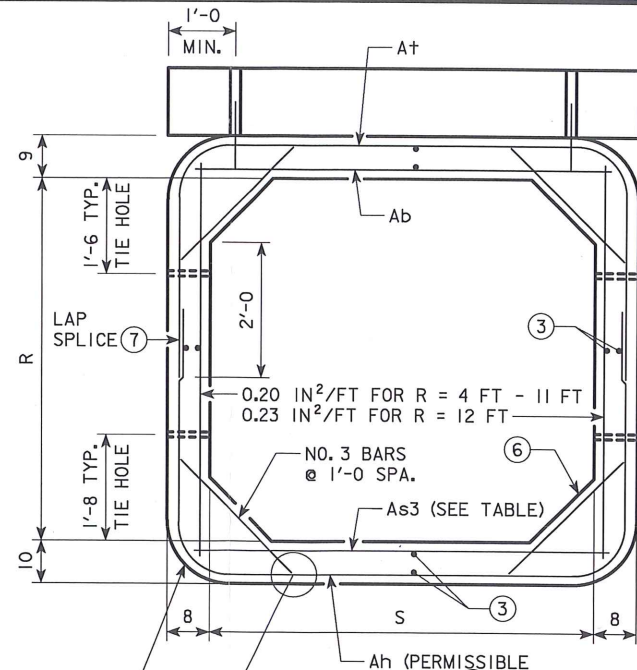
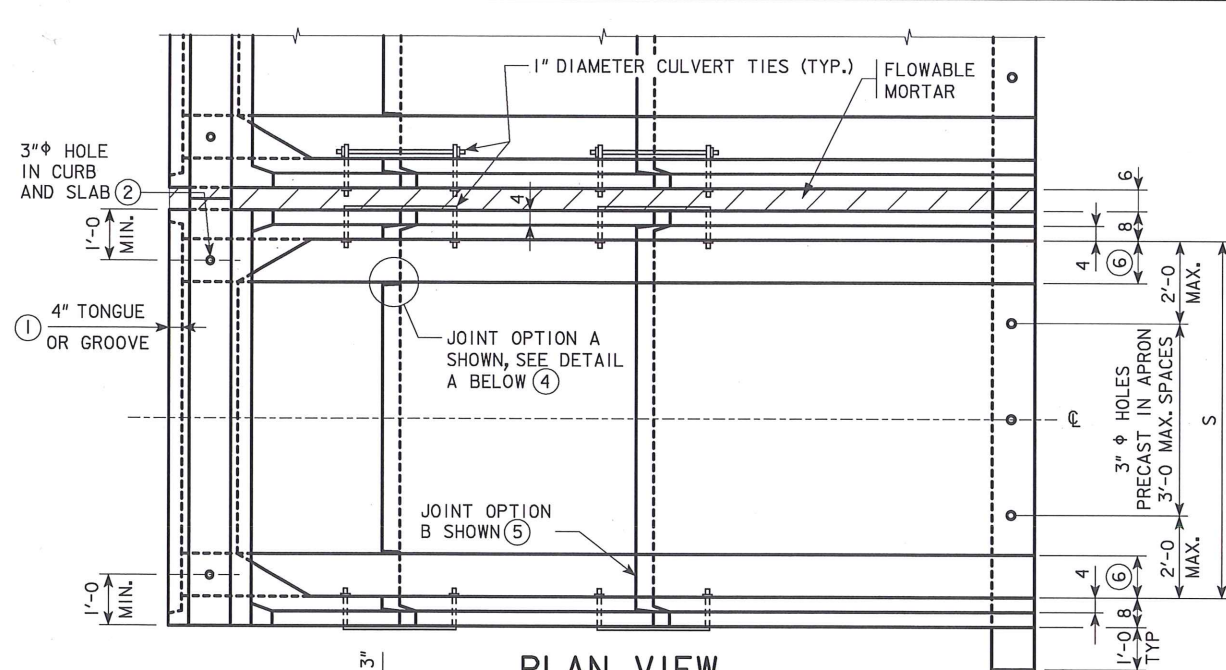
A CONCRETE CAP SHALL BE PLACED ON TOP OF THE POROUS BACKFILL BETWEEN THE PRECAST CULVERTS FOR A DEPTH OF 8 INCHES FROM THE TOP OF THE BARREL SLABS, THE TOP OF THE END SECTION WALLS, AND TO A 8 INCH DEPTH AT THE ENDS OF THE APRON OF THE END SECTIONS. THE CONCRETE SHALL BE CLASS C CONCRETE IN ACCORDANCE WITH SECTION 2403, OF THE STANDARD SPECIFICATIONS. THE CONCRETE CAP, APPROXIMATELY 0.03 CU. YDS. PER FOOT, INCLUDING MATERIAL AND LABOR IS INCLUDED IN THE BID ITEMS "PRECAST CONCRETE BOX CULVERT" AND "PRECAST BOX CULVERT STRAIGHT END SECTION".

## NOTES:

1. DOUBLE WELDED PIPE OR DOUBLE EYE BOLT TYPE TIES ARE REQUIRED FOR THE BARREL WALL ADJACENT TO THE FIRST PRECAST CULVERT STRUCTURE PLACED AT THE SITE TO ALLOW THE TIES TO BE TIGHTENED FROM THE INSIDE OF THE BARREL WALL.
2. THE TYPE 1 PARAPETS LENGTH SHALL BE INCREASED SO THE ADJOINING ENDS WILL ABUT AGAINST EACH OTHER AT THE CENTERLINE OF CULVERT FOR SIDE-BY-SIDE PRECAST CULVERT STRUCTURES.
3. THE TYPE 3 LINTEL BEAMS AND PARAPETS LENGTH SHALL BE INCREASED SO THE ADJOINING ENDS WILL ABUT AGAINST EACH OTHER AT THE CENTERLINE OF CULVERT FOR SIDE-BY-SIDE PRECAST CULVERT STRUCTURES.
4. THE CURTAIN WALLS LENGTH SHALL BE SHORTENED SO THE ADJOINING ENDS WILL ABUT AGAINST EACH OTHER AT THE CENTERLINE OF CULVERT FOR SIDE-BY-SIDE PRECAST CULVERT STRUCTURES.

**PRELIMINARY  
NOT FOR CONSTRUCTION**

DESIGN FOR ?  
**14' x 14' x ? PRECAST REINFORCED  
 CONCRETE BOX CULVERT**  
**SIDE-BY-SIDE CULVERT DETAILS**  
 STATION: 15+62.33 MAY, 2013  
**MITCHELL COUNTY**  
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION  
 DESIGN SHEET NO. \_\_\_\_ OF ? FILE NO. 30927 DESIGN NO. 113



**DOWEL SETTING NOTE :**

THE 5fa BARS MAY BE SET AS DOWELS IN DRILLED HOLES. HOLES SHALL BE DRILLED TO THE DEPTH REQUIRED TO ACHIEVE BAR EMBEDMENT AS SHOWN IN THE "SIDE ELEVATION" DETAIL. THE DOWELS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. EITHER OF THE FOLLOWING SYSTEMS MAY BE USED AS A BONDING AGENT:

A. POLYMER GROUT SYSTEM SHALL BE IN ACCORDANCE WITH ARTICLE 2301.03, E, OF THE STANDARD SPECIFICATIONS.

B. HYDRAULIC CEMENT GROUT SYSTEMS. DRILLED HOLES ARE TO BE 2 1/2 TIMES THE DOWEL DIAMETER AND ARE TO BE BLOWN CLEAN WITH COMPRESSED AIR IMMEDIATELY PRIOR TO PLACING GROUT. THE HYDRAULIC CEMENT GROUT SHALL BE ONE OF THOSE APPROVED IN MATERIALS I.M. 491.13.

- CONSTRUCTION NOTES:**
- PRECAST BOX CULVERT END SECTIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH DETAILS AND NOTES, AS SHOWN BELOW:
- REINFORCING FOR PRECAST END SECTIONS & CURTAIN WALLS SHALL BE WELDED WIRE REINFORCING (WWR) MEETING THE REQUIREMENTS OF AASHTO LRFD SECTION 5. THE CONCRETE COVER OVER THE REINFORCING STEEL SHALL NOT BE LESS THAN 1.5 INCHES OR GREATER THAN 2.0 INCHES.
- REFER TO SHEET PRCB G1-13 FOR ADDITIONAL NOTES.
- REFER TO FABRIC DETAIL ON SHEET PRCB G2-13 FOR MULTIPLE WWR LAYERS.
- USE TONGUE ON INLET END SECTION AND GROOVE ON OUTLET END SECTION.
  - FILL HOLES WITH GROUT. GROUT SHALL CONSIST OF 1 PART CEMENT AND 2 PARTS SAND. USE AIR ENTRAINED PORTLAND CEMENT. GROUT MIX SHALL HAVE A MAXIMUM SLUMP OF 4 INCHES.
  - MINIMUM LONGITUDINAL REINFORCEMENT SHALL BE 0.06 SQ. INCHES PER PERIPHERAL FOOT ON ALL FACES OF THE END SECTION, EXCEPT IN THE TONGUE AND GROOVE AREA.
  - JOINT OPTION A: PROVIDE JOINT IN WALLS AND FLOOR. TERMINATE JOINT AT HAUNCH. SEE DETAIL A ON THIS SHEET.
  - JOINT OPTION B: PROVIDE JOINT IN WALLS, FLOOR AND HAUNCH.
  - HAUNCH DIMENSION TO MATCH BARREL HAUNCH SIZE.
  - LAP SPLICES SHALL BE CLASS C AND SHALL BE DESIGNED ACCORDING TO THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

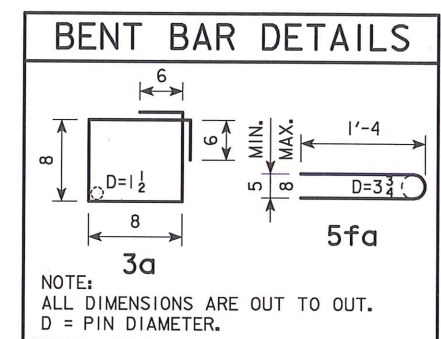
APRON DIMENS.	
BOX RISE R (FT)	APRON LENGTH L (FT)
14	37'-3

DIMENS.		Ah & As3 REINF.	
SPAN S (FT)	SECTION HT. H (FT)	Ah (IN <sup>2</sup> /FT)	BOTTOM SLAB THICK. (IN) REQUIRED As3 (IN <sup>2</sup> /FT)
14			8 10
14		1.22	---
			1.03

NOTE: H IS THE LARGEST VERTICAL DIMENSION OF THE SECTION.

A+ & Ab REINF.	
SPAN S (FT)	A+ (IN <sup>2</sup> /FT) Ab (IN <sup>2</sup> /FT)
14	0.47 0.91

PARAPET LONGIT. REINFORCING	
SPAN S (FT)	REQUIRED BAR SIZE
14'	#7



DESIGN FOR ?

**14' x 14' x ? PRECAST REINFORCED CONCRETE BOX CULVERT**

**TYPE I END SECTION DETAILS**

STATION: 15+62.33 MAY, 2013

**MITCHELL COUNTY**

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. \_\_\_\_\_ OF ? FILE NO. 30927 DESIGN NO. 113